

What is claimed is:

1. A method for the preparation of a conditioned organic pigment comprising at least a first component selected from the group consisting of 4,4'-diamino-1,1'-dianthraquinonyls, diketopyrrolo[3,4-c]pyrroles, triphenedioxazines, indanthrones, perylenes, phthalocyanines and quinacridones, and a second component forming a solid solution or a mixed crystal with the first component, the molar ratio of the first component to the second component in the solid solution or mixed crystal being greater or equal to 1, wherein
  - (1) the first component and the second component are each independently from the other so synthesised that they precipitate from a liquid reaction mixture, and a pigment suspension is formed in the liquid reaction medium;
  - (2) optionally, the concentration of pigment in one or both pigment suspensions from step (1) is increased by removing all or part of the liquid reaction medium;
  - (3) optionally, a washing agent is added once or more than once and then the concentration of pigment in one or both pigment suspensions from step (1) or (2) is increased by removing all or part of the liquid phase;
  - (4) optionally, the pigment suspension is dried;
  - (5) the pigment suspensions from step (1), the concentrated pigment suspensions from step (2), or the pigment suspensions (treated with a washing agent and concentrated) from step (3), the liquid phases of which consist substantially of water, an organic liquid or a mixture thereof, or the dried pigments from step (4) are each transferred into a storage vessel or both transferred into the same storage vessel, optionally with addition of water or an organic liquid, preferably keeping the pigment surface substantially wetted with liquid reaction medium, washing agent, organic liquid or water all the time;
  - (6) if the liquid phase of the pigment suspension in one or both storage vessels does not already consist of water and optionally an organic liquid, the amount of organic liquid being from 0 to 50% by weight, based on the total amount of organic liquid and water, the composition of the pigment suspension is so

- 23 -

modified by means of the addition of water that the amount of organic liquid is from 0 to 50% by weight, based on the total amount of organic liquid and water; and/or optionally organic liquid is added in such quantity that its total amount does not exceed 50% by weight, based on the total amount of organic liquid and water;

(7) the pigment suspension from the storage vessel containing the first component and if applicable the pigment suspension from the storage vessel containing the second component are passed a number of times through an agitated media pearl mill in a circulating or shuttle mode of operation, the agitated media pearl mill having a smaller chamber volume than the volume of the pigment suspension and being operated at a specific power density of at most  $2.0 \text{ kJ}\cdot\text{s}^{-1}$  per litre of grinding space, whereby in case of more than one storage vessel the flow between the storage vessels and the pearl mill is controlled in such a way that the contents of all storage vessels are mixed together at any stage up to before the last pass in the pearl mill; whereby the first component and the second component combine to form a solid solution or a mixed crystal;

(8) optionally, the concentration of pigment in the pigment suspension from the agitated media pearl mill is increased by removing all or part of the liquid reaction medium;

(9) optionally, a washing agent is added once or more than once to the pigment suspension from step (7) or (8) and then the concentration of pigment in the pigment suspension is increased by removing all or part of the liquid phase;

and

(10) optionally, the pigment is isolated by removing the liquid surrounding it.

2. A method for the preparation of a conditioned pigment according to Claim 1, wherein the second component is from the 1-aminoanthraquinone, anthanthrone, anthrapyrimidine, azo, azomethine, dioxazine, diketopyrrolopyrrole, flavanthrone, indanthrone, isoindoline, isoindolinone, isoviolanthrone, perinone, perylene, phthalocyanine, pyranthrone, quinacridone, quinacridonequinone, quinophthalone or thioindigo series, preferably selected from the group consisting of 4,4'-diamino-

1,1'-dianthraquinonyls, diketopyrrolo[3,4-c]pyrroles, triphenedioxazines, indanthrones, perylenes, phthalocyanines and quinacridones.

3. A method for the preparation of a conditioned pigment according to Claim 1 or 2, wherein the first component is selected from the group consisting of quinacridones, perylenes and diketopyrrolopyrroles.

4. A method according to Claim 1, 2 or 3, wherein the first component and the second component are both 4,4'-diamino-1,1'-dianthraquinonyls, both diketopyrrolo[3,4-c]pyrroles, both triphenedioxazines, both indanthrones, both perylenes, both phthalocyanines or both quinacridones.

5. A method according to Claim 1, 2 or 3, comprising two quinacridones or a quinacridone and a diketopyrrolo[3,4-c]pyrrole, preferably unsubstituted quinacridone and 2,9-dichloroquinacridone, unsubstituted quinacridone and 3,6-diphenyl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione, unsubstituted quinacridone and 3,6-di(4'-chloro-phenyl)-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione, 2,9-dichloroquinacridone and 3,6-diphenyl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione, 2,9-dichloroquinacridone and 3,6-di(4'-chloro-phenyl)-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione or 3,6-diphenyl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione and 3,6-di(4'-chloro-phenyl)-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione, most preferred comprising unsubstituted quinacridone and 2,9-dichloroquinacridone, unsubstituted quinacridone and 3,6-diphenyl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione or 2,9-dichloroquinacridone and 3,6-di(4'-chloro-phenyl)-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione.

6. A method according to Claim 1, 2, 3, 4 or 5, wherein the organic liquid is neutral and comprises oxygen in its molecule.

7. A method according to Claim 1, 2, 3, 4, 5 or 6, wherein the organic liquid has a dipole moment  $\mu$  of  $2.8 - 6.0 \cdot 10^{-18}$  esu, preferably  $3.3 - 5.5 \cdot 10^{-18}$  esu, most preferred  $3.8 - 5.0 \cdot 10^{-18}$  esu.

8. A method according to Claim 1, 2, 3, 4, 5, 6 or 7, wherein the organic liquid is acetamide, formamide, methylacetamide, methylformamide, caprolactam, valerolactam, 1,1,2,2-tetramethylurea, dimethyl sulfoxide, sulfolane, nitromethane,

- 25 -

nitrobenzene, acetonitrile, methanol, ethylene carbonate, dimethylacetamide, dimethylformamide and N-methylpyrrolidone, preferably dimethyl sulfoxide (DMSO), dimethylformamide (DMF) or N-methylpyrrolidone (NMP), especially N-methylpyrrolidone, or is a mixture of a plurality of organic liquids, the overall polarity of which lies in the range of  $2.8 - 6.0 \cdot 10^{-18}$  esu.

9. A method according to Claim 1, 2, 3, 4, 5, 6, 7 or 8, wherein the amount of organic liquid is from 1 to 30% by weight, preferably from 3 to 20% by weight, especially from 5 to 10% by weight

10. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8 or 9, wherein the amount of organic liquid is from 0 to 3% by weight of liquid, based on the total amount of organic liquid and water, preferably at a pH in the range of from 9 to 11.

11. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10, wherein the temperature of the suspension in the pearl mill is at the beginning of step (7) from 10 to 50°C, preferably from 15 to 45°C, and at the end of step (7) from 30 to 100°C, preferably from 50 to 100°C.

12. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11, wherein an additional substance selected from the group consisting of acids, bases, resins, growth inhibitors, phase directors, dispersing agents and wetting agents, preferably a growth inhibitor, phase director, dispersing agent or wetting agent, is added in any step (1), (2), (3), (5), (6), (7), (8) or (9).

13. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12, wherein the total treatment period in the agitated media pearl mill is from 10 to 600 minutes, preferably from 20 to 200 minutes.

14. A method according to Claim 13, wherein after two-third of the total treatment period, the radial speed is adjusted to a value of at most  $11 \text{ m} \cdot \text{s}^{-1}$ , preferably from 1 to  $8 \text{ m} \cdot \text{s}^{-1}$ , especially from 2 to  $5 \text{ m} \cdot \text{s}^{-1}$ .

15. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14, wherein the pigment obtained in step (10) consists of at least 90% by weight of particles have a size of  $L \pm \frac{1}{2}\bar{L}$ , wherein the average particle size  $\bar{L}$  is from 0.01 to

- 26 -

3  $\mu\text{m}$ , especially from 0.05 to 2  $\mu\text{m}$ , preferably at least 80% by weight of particles having a size of  $L \pm \frac{1}{4} \bar{L}$ .

16. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14 or 15, wherein the pigment obtained in step (10) is hiding and leads to a color difference  $\Delta E^*$  less or equal to 15, preferably  $\leq 10$ , most preferably  $\leq 5$ , measured in a  $25 \pm 5 \mu\text{m}$  thick acrylic or polyester enamel coating system having a pigment to binder weight ratio of 0.18 over a black and white background.
17. A method according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14 or 15, wherein the pigment obtained in step (10) is transparent and has a particle size of 0.001–0.3  $\mu\text{m}$ , preferably 0.01–0.2  $\mu\text{m}$ .